

**PATENT SPECIFICATION**(11) **1 518 408**

- 1518 408**
- (21) Application No. 36410/76 (22) Filed 2 Sept. 1976  
 (31) Convention Application No. 2 635 503  
 (32) Filed 6 Aug. 1976 in  
 (33) Fed. Rep. of Germany (DE)  
 (44) Complete Specification published 19 July 1978  
 (51) INT CL<sup>2</sup> A47J 19/02  
 (52) Index at acceptance A4C 14

(54) **HAND-OPERATED SQUEEZER FOR EXTRACTING THE JUICE FROM CITRUS FRUITS**

(71) We, ACKERET DESIGN STUDIOS, a Swiss Company, of Lohwissstrasse 26, CH-8123 Ebmatingen, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described.

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**SPECIFICATION NO 1518408**

By a direction given under Section 17 (1) of the Patents Act 1949 this application proceeded in the name of Zyliss Zyssel A.G., a Body Corporate organised according to the laws of Switzerland, of Industriering, CH-3250 Lyss, Switzerland.

Bas 49173/8

**THE PATENT OFFICE**

..... piece of fruit from which the juice is to be extracted is pressed on the squeezer member and the juice is extracted by effecting a relative twisting movement between the fruit and the squeezer member. Throughout this Specification, the term "hand-operated", as applied to squeezers, means that fruit halves are pressed on to the squeezer members by hand; the relative twisting movement between a fruit half and a squeezer member may be effectively manually or by a motor which rotates the squeezer member.

The forces occurring during the squeezing make it necessary to hold the squeezer tightly with the other hand, to prevent twisting, slipping away or even tipping up of the squeezer.

From fruit squeezers used mainly in industry, it is known to increase the efficiency of the squeezing by arranging a plurality of identical squeezer members. With these squeezers, the halves of the fruit are guided onto the cones by means of very complicated additional devices, the squeezing process is effected and the squeezed fruit halves removed. The considerable technical resources and the very high cost of

..... London has now taken as its basis the concept of making both hands available for the manual squeezing of halves of fruit without the one hand having to hold the apparatus firmly, and by this means increasing the possible output of a hand-operated squeezer in juice squeezed out by double the amount over the same period of time, without the manufacturing costs of squeezers of this kind being markedly increased with respect to the conventional hand-operated squeezers.

To solve this problem the invention consists in that the hand-operated squeezer has at least one pair of generally conical squeezer members of the same size and shape, wherein the axes of the or each pair of squeezer members are arranged in a common plane which is perpendicular when the squeezer is in use, and together form an angle of approximately 30°, the tips of the cones pointing away from the apex of the angle.

The invention makes it possible to provide a squeezer in which the two squeezer members (cones) may be used conveniently at the same time because, by virtue of the disposition of the cones, the squeezer does not move out of its position during squeezing with both hands and so

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## (54) HAND-OPERATED SQUEEZER FOR EXTRACTING THE JUICE FROM CITRUS FRUITS

(71) We, ACKERET DESIGN STUDIOS, a Swiss Company, of Lohwistrasse 26, CH—8123 Ebmatingen, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

10 This invention relates to a hand-operated squeezer for extracting the juice from citrus fruits.

Known commercial citrus fruits squeezers comprise in general a squeezer member, in the shape of approximately a half ellipsoid (referred to in the following as a "cone" or as "conical" to simplify matters), which has ribs on one surface, and also juice-collecting dishes and/or strainers for retaining the flesh 20 of the fruit squeezed out with the juice. A half of the piece of fruit from which the juice is to be extracted is pressed on the squeezer member and the juice is extracted by effecting a relative twisting movement between the fruit and the squeezer member. Throughout this Specification, the term "hand-operated", as applied to squeezers, means that fruit halves are pressed on to the squeezer members by hand; the relative twisting movement between a fruit half and a squeezer member may be effectively manually or by a motor which rotates the squeezer member.

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manufacturing such mechanical squeezers are not in keeping with their useful effect, so that from the start they are not suitable for household purposes.

Hand-operated squeezers are furthermore known in which cones of different sizes are arranged next to one another, or larger cones may be placed on smaller cones to accommodate different sized fruit, for example grapefruit on the one hand and lemons on the other.

As regards the sequence of the operation, all the known hand-operated squeezers have in common the fact that first of all the fruit is halved, then one half of the piece of fruit is put down somewhere, whilst the other half is squeezed, and subsequently the second half is squeezed.

The present invention has now taken as its basis the concept of making both hands available for the manual squeezing of halves of fruit without the one hand having to hold the apparatus firmly, and by this means increasing the possible output of a hand-operated squeezer in juice squeezed out by double the amount over the same period of time, without the manufacturing costs of squeezers of this kind being markedly increased with respect to the conventional hand-operated squeezers.

To solve this problem the invention consists in that the hand-operated squeezer has at least one pair of generally conical squeezer members of the same size and shape, wherein the axes of the or each pair of squeezer members are arranged in a common plane which is perpendicular when the squeezer is in use, and together form an angle of approximately 30°, the tips of the cones pointing away from the apex of the angle.

The invention makes it possible to provide a squeezer in which the two squeezer members (cones) may be used conveniently at the same time because, by virtue of the disposition of the cones, the squeezer does not move out of its position during squeezing with both hands and so

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does not need to be held firm.

In its simplest case, the squeezer has only one pair of cones. If an adaptation to fruit of different size is to be effected, then two or more pairs of cones are provided.

Several embodiments of a hand-operated squeezer, each constructed in accordance with the invention, will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a first embodiment in section through the axes of both cones;

Figure 2 is a perspective illustration of the embodiment of Figure 1;

Figure 3 illustrates a second embodiment in partially cut away side view;

Figure 4 shows the plan view of the embodiment of Figure 3;

Figure 5 is a plan view similar to Figure 4 of an embodiment with two pairs of cones;

Figure 6 shows an additional device which may be provided, for example, with the embodiment of Figures 3 and 4;

Figure 7 illustrates a side view of a hand-operated squeezer with motor-driven squeezer members, wherein parts are broken away and others are shown in section;

Figure 8 is a plan view of a hand-operated squeezer similar to that of Figure 7; and

Figures 9 and 10 show in side view and plan view respectively, a further embodiment of a hand-operated squeezer with motor-driven squeezer members.

Referring to the drawings, the hand-operated squeezer shown in Figures 1 and 2 is constructed in two parts. On a circular juice-collecting dish 12 there is a one-piece moulded or injection-moulded plastics part 14 consisting of two squeezer members (cones) 16 and a strainer 18 surrounding the support for the cones, which strainer is delimited at its perimeter by an upturned rim 19. The axes of the cones 16 lie in a plane which, when the dish 12 is standing on a horizontal base, for example, a table, is vertical. The axes of the cones 16 define an angle of 30°. It has been shown that this angle is the most favourable for the simultaneous usage with both hands of the squeezer. In the middle, the minimum distance between the two cones 16 is one centimetre, this distance being adequately large to give even two fruits with thick skins freedom to rotate. A larger distance would, on the other hand, only make the cost of material for the squeezer unnecessarily high. For this same reason part 14 is hollow.

The hand-operated squeezer of Figures 3 and 4 again consists of a dish 30 with a circular outline, the dish being provided with a pouring lip 32 and opposite to this a handle 34. On a circumferential rim of the dish 30 there rests a strainer 36. A bulge 38 of the strainer 36 engages in the pouring lip

32 and this prevents the strainer from rotating relative to the dish 30. At its centre the strainer base 40 carries a pin 42 on which a support 44 of a double cone member 46 is placed. The complementary cross-section of the pin 42 and of the support 44 are polygonal, for example, rectangular or hexagonal, so that the support rests on the pin so that it cannot rotate, but may still be removed.

The double cone member 46 has a base 48 attached to the support 44 and supporting the two cones 50 which are again inclined at an angle of about 30° with respect to one another. The compressive forces are transferred from the base 48 to the support 44 and from this to the strainer base 40. So that these forces are finally conveyed with certainty to the dish 30, strainer openings 52 are constructed as radial slots, and the strainer base may slope outwards and downwards slightly (which is not apparent from the drawings).

The support 44 is cylindrical outside and serves as a pivot for a cleaning element 54. The cleaning element 54 has a central bearing casing 56, which may be rotated on the support 44, and to which there are joined radial cleaner bars 58. At one end of one bar 58 there is a tab 60. Stops (not shown) serve to restrict the rotary movement of the cleaning element 54 to the sector indicated by the arrow 62.

The cleaning element 54 serves to clear away the flesh of the fruit squeezed out with the juice from the strainer base 40 beneath the cones 50, that is, into the sectors between the cones. For this reason, this embodiment is especially suited to extracting the juice from large quantities of citrus fruit in quick succession, because the otherwise usual, troublesome cleaning of the residues from the strainer need be effected only when the juice has been extracted from a large quantity of fruit, for example, several kilograms. The strainer base 40 has strainer openings 52 in the sectors intended for depositing the waste flesh as well, so that the remainder of the juice still escaping from the flesh of the fruit can still drip down.

The embodiment of Figure 5 differs from the embodiments previously described in that here two pairs of conical squeezer members 70, 70' and 72, 72' are provided which rest on a base 74 common to both with a central support. The pair 70, 70' is for oranges and grapefruit, and the pair 72, 72' is intended for lemons, mandarin oranges and clementines. There are no stops provided here for the cleaning element 76. The flesh of the fruit reaching the strainer base is, on the contrary, "swept" into the sectors not in use in each case.

Since hand-operated squeezers con-

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structed in accordance with the invention provide the opportunity to extract the juice from two halves of a piece of fruit simultaneously, it is advantageous to provide the squeezer itself with an instrument with which the fruit can be cut in half. Figure 6 shows schematically how this can occur, for instance, in the case of a squeezer according to Figures 3 and 4. A cutting edge 80 rests horizontally between the two cones 50 and extends into the plane of symmetry of the double cone member 46. The cutting edge 80 is held by a plastics carrier 82 which may be pulled vertically out of the base 48' and which may be locked in the pulled-out position by locking elements (not shown). When using the squeezer, the user holds the piece of fruit with both hands and cuts it by moving it relative to the cutting edge 80, after which squeezing is effected immediately on the cones 50 without it being necessary to let go of the halves of the piece of fruit. The juice escaping as the piece of fruit is cut in half (in the case of ripe fruit this is a not inconsiderable amount) is not lost, but passes into the dish as well. The cutting edge 80 is lowered again for storage purposes wherein the milled edges 84 facilitate manipulation. The protective plates 86 prevent the user from being injured on the otherwise exposed cutting edge 80.

Figures 7 and 8 show hand-operated squeezers each of which incorporates a pair of motor-driven squeezer members. A motor 100, in general an electric motor driven by mains electricity, drives two cones 104 via a gear unit 102, in opposite directions. The cones 104 are each integral with a respective strainer 106 which rotates with its cone. Beneath the cones 104 there is a housing 108 whose base 110 is parallel to the strainers 106. Since here the cones 104 are again arranged at an angle (30°), the sections of the housing base 110 beneath the strainers are at an angle of 15° to the horizontal. At the lowest point of both bases 110 there is an outlet 112. (The drawing is only diagrammatic. In practice, the two bases 110 converge to an outlet 112 common to both, beneath which there is arranged a collecting vessel for the juice.)

According to Figure 7, right round the strainers 106, the housing 108 is provided with an upturned rim 114 which is interrupted at two points, namely at 116 for the left-hand cone and at 118 for the right-hand cone, for the removal of waste flesh as described below. In the area of these breaks, the upper edge of the housing 108 is approximately flush with the upper edge of the strainer 106 rotating behind it. According to Figure 8, on the other hand a rim 119 (although only a low one) is left in the area of the openings 116', 118', which prevents

juice from flowing away, but nevertheless permits the waste flesh to be removed since this is taken round by means of nubs 121 on the strainers 106. Through the breaks or openings 116, 118 or 116', 118' the flesh of the fruit accumulating on the strainer 106 is conveyed outwards into a waste container 120, for which purpose there is provided a stationary cleaning element 122 which engages above the strainers 106. The flesh of the fruit taken round by the rotating strainers 106 piles up in front of the bars 124 of the cleaning element 122, a slight pressure being exerted which squeezes out the juice still contained in the fruit flesh. The fairly dry flesh finally crumbles, when sufficient has piled up, into the waste container 120.

In the embodiment of Figure 7, the cleaning element 122 is simply placed on the device. According to Figure 8, however, the housing 108, the cones 104 and the strainers 106 form an assembly which may be placed on and removed from the gear unit 102 and the cleaning element 122 is provided with a guide bar 125 and a grip 127 so that it may be moved in the direction of the arrow 129 and thereby completely push the waste flesh into the container 120 when the squeezing operation has finished while also making it possible to remove the assembly of the housing 108, the cones 104 and the strainers 106. For this purpose, a wedge or the like (not shown) may be provided on the guide bar 125 to engage between the cone assembly 104, 106, 108 and the frame of the motor-gear unit 100, 102 when the guide bar is pulled in the direction of the arrow 129 and so lift up the cone assembly. It will be appreciated that to this end, suitable detachable couplings must be provided between the gear output shafts and the cones 104.

It is apparent that the embodiment is especially suited to commercial use since the juice extraction process need be interrupted only, and then for only a short time, when the waste container 120 is full. Operation can be carried out here effectively twice as fast as it can be effected with a conventional one-cone hand-operated squeezer, which in addition has to be cleaned from time to time, this cleaning often involving complicated manipulations. Compared with this, the increase in price for the manufacture of the parts of the squeezer consisting essentially (with the exception of the motor) of plastics, is insignificant.

In the embodiment of Figures 9 and 10, a motor 150 drives, via gear unit 152, only the cones 154, whereas the strainers 156 and the housing 158 remain stationary. With each cone 154 there is associated a cleaning element 160 which likewise rotates with its cone: to this end, each cone and its

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5	associated cleaning element may be injection moulded as a one-piece plastics part. The cleaning element 160 conveys the flesh of the fruit outwards into an opening 162 in the base above a waste container 164, whilst the juice is retained by a low rim 166 on the strainer 156. The cleaning elements 160 each have a notch 168 complementary to the rim 166. When, as shown, a cleaning element 160 is directly joined to its cone 154, the rotational speed has to be relatively low. To operate quickly, such a low rotational speed is not adequate, but at about 100 rev/min, the cleaning element 160 would sweep the juice, together with the flesh of the fruit, into the waste container 164. For this reason, if it is required to rotate the cones 154 at higher speeds, it is desirable that the cleaning elements are not formed in one piece with the cones as shown in Figs. 9 and 10 but, rather, as separate elements so that they can be rotated more slowly than the cones 154 or even actuated only intermittently.	claim 1 or claim 2, wherein the squeezer members are arranged on a common base which is secured to a dish for collecting the squeezed-out juice, or to a strainer.
10	15	4. A hand-operated squeezer as claimed in any one of claims 1 to 3, wherein the distance between the axes of the or each pair of squeezer members, at the level of their bases, is equal to, or slightly larger than, the diameter of the fruit from which juice is to be extracted.
15	20	5. A hand-operated squeezer as claimed in any one of claims 1 to 4, wherein the two squeezer members of the or each pair are motor-driven at the same speed of revolution.
20	25	6. A hand-operated squeezer as claimed in any one of claims 1 to 5, wherein a single strainer is associated with all the squeezer members, on which strainer the waste flesh torn away during the squeezing collects.
25	30	7. A hand-operated squeezer as claimed in any one of claims 1 to 5, wherein a respective strainer is associated with each squeezer member of the or each pair on which strainners the waste flesh torn away during the squeezing collects.
30	35	8. A hand-operated squeezer as claimed in claim 6 or claim 7, further including at least one cleaning element to clear away the waste flesh from the out-flow area directly beneath each squeezer member.
35	40	9. A hand-operated squeezer as claimed in claim 8, wherein a single cleaning element is associated with all the squeezer members.
40	45	10. A hand-operated squeezer as claimed in claim 8 when appendant to claim 5, wherein a respective cleaning element is associated with each squeezer member and rotates with it.
45		11. A hand-operated squeezer as claimed in claim 7 when appendant to claim 5, wherein the strainners rotate together with the squeezer members.
		12. A hand-operated squeezer as claimed in any one of claims 1 to 4, wherein all the squeezer members are injection-moulded in one piece from plastics materials.
		13. A hand-operated squeezer as claimed in claim 6 wherein all the squeezer members are constructed together with the strainer as a one-piece plastics part.
		14. A hand-operated squeezer as claimed in claim 10 wherein each squeezer member and its respective cleaning element are injection-moulded as a one-piece plastics part.
		15. A hand-operated squeezer as claimed in any one of the preceding claims, further including a device for halving the fruit.
		16. A hand-operated squeezer as claimed in claim 15, wherein the device for halving the fruit comprises a cutting edge which may be lowered and which is arranged between the squeezer members of a pair.

WHAT WE CLAIM IS:—

1. A hand-operated squeezer for the extraction of juice from citrus fruits, the squeezer comprising at least one pair of generally conical squeezer members of the same size and shape, wherein the axes of the or each pair of squeezer members are arranged in a common plane which is perpendicular when the squeezer is in use, and together form an angle of approximately 30°, the tips of the cones pointing away from the apex of the angle.
2. A hand-operated squeezer as claimed in claim 1, comprising two squeezer member pairs, the members of each pair being of different sizes for use with different sized fruits.
3. A hand-operated squeezer as claimed in

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17. A hand-operated squeezer as claimed in claim 8 wherein the cleaning element may be moved away from the area above the strainer.
- 5 18. A hand-operated squeezer as claimed in claim 11 wherein the squeezer members and strainers together with a housing, form an assembly which may be placed on a motor-gear unit part.
- 10 19. A hand-operated squeezer as claimed in claim 18, further including a detachable coupling between the gear unit output shafts and the squeezer members.
- 15 20. A hand-operated squeezer as claimed in any one of the preceding claims, wherein

each of the squeezer members is ribbed on its outer surface.

21. A hand-operated squeezer substantially as hereinbefore described with reference to, and as illustrated by, Figures 1 and 2, Figures 3 and 4, Figures 3 and 4 as modified by Figure 5, Figures 3 and 4 as modified by Figure 6, Figure 7, Figure 8 or Figures 9 and 10, of the accompanying drawings.

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1518408 COMPLETE SPECIFICATION  
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Sheet 1

Fig. 1

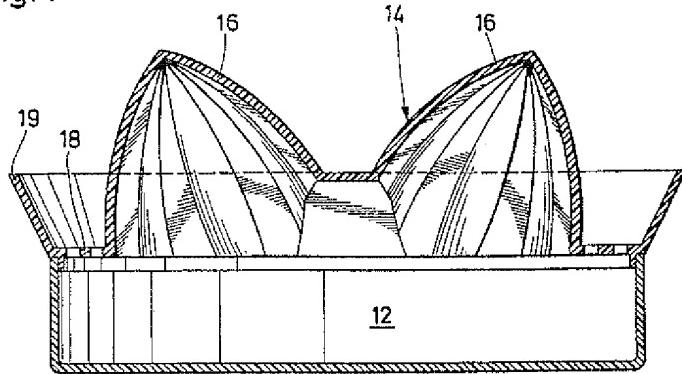
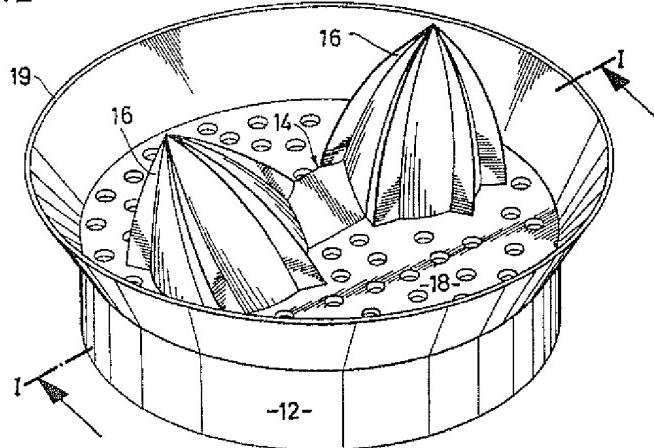
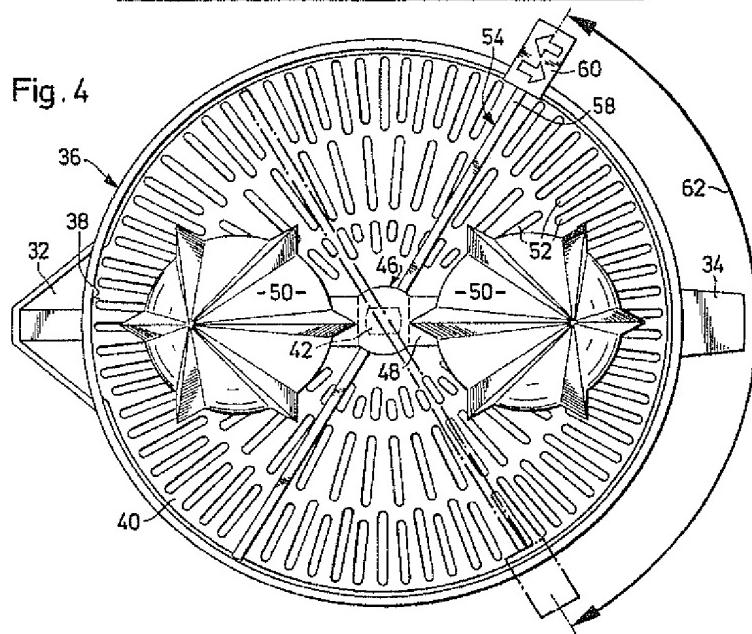
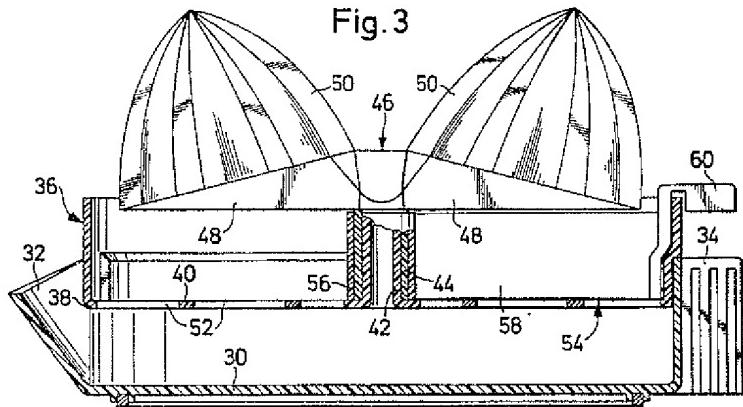


Fig. 2

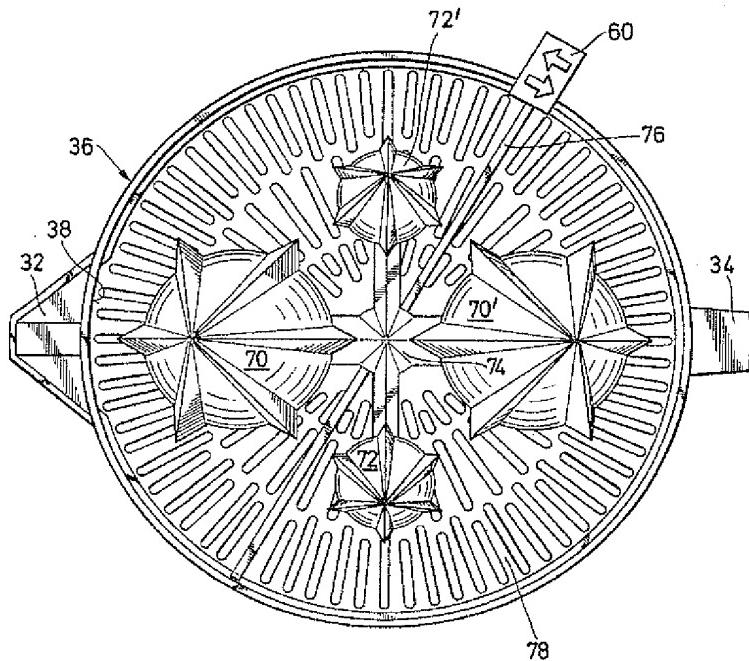


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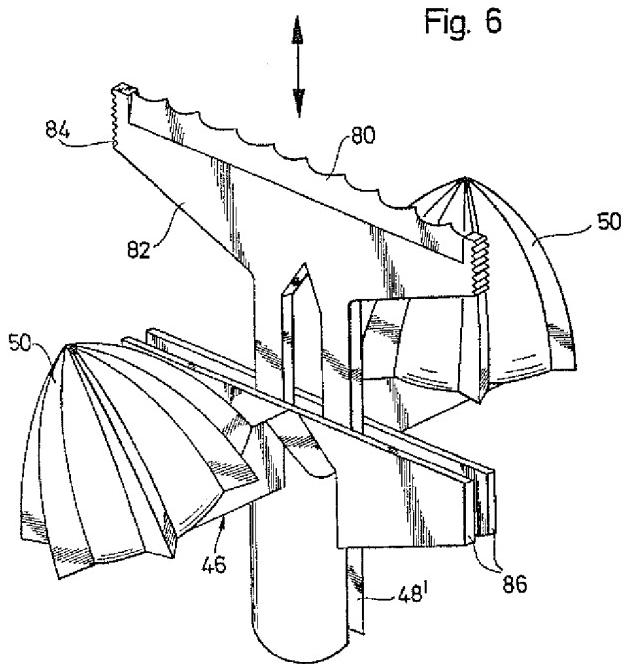
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Fig. 5



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Fig. 6



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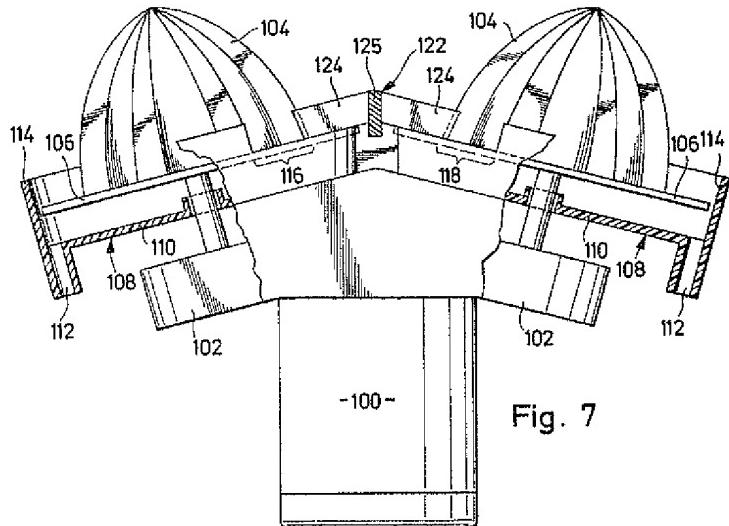


Fig. 7

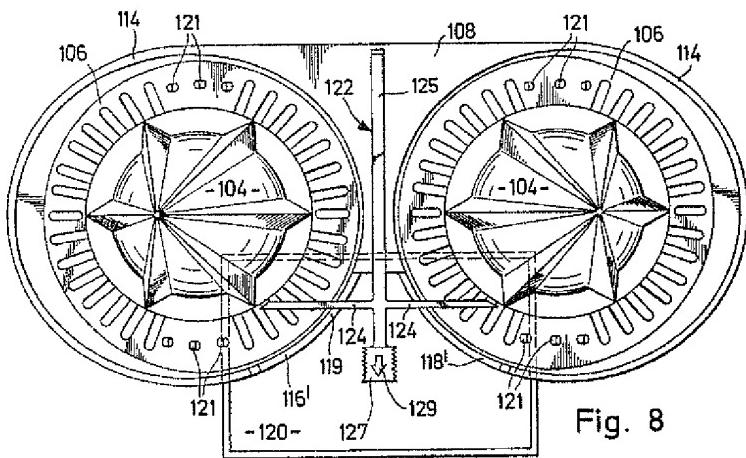


Fig. 8

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